

JUNE 1978

No. 6



FISHING INFORMATION

Southwest Fisheries Center-La Jolla, California



noaa

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION

NATIONAL MARINE
FISHERIES SERVICE

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

SOUTHWEST FISHERIES CENTER

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LA JOLLA, CALIFORNIA 92037

FISHING INFORMATION

JUNE 1978, No. 6



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I. Barrett, Director, SOUTHWEST FISHERIES CENTER
J. Carr, Deputy Director

PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

To cancel delivery of this publication in the event you no longer need to receive it, or to change the delivery address if you are moving but still need to receive it, please notify us by writing: James A. Renner, Editor, Fishing Information, National Marine Fisheries Service, Southwest Fisheries Center, P. O. Box 271, La Jolla, California 92038.

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ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and
15 day Supplement)

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CARTOGRAPHY:
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National Ocean Survey, Pacific Marine Center, Seattle, Washington

Fisheries Research Board of Canada, Pacific Environment Institute, West Vancouver, British

Columbia by L.F. Giovando from observations by:

J. Redhead at Langara Island Light; C.T. Hilliar at Cape St. James Light;

L. Collins at Kains Island Light; M.V. Stewart at

Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *Hawaiian Queen* of the Matson Navigation Co. The data are processed under supervision of D.R. McLain at the NMFS Pacific Environmental Group, Monterey, California, using computer facilities of the Fleet Numerical Weather Central, Monterey. The project is partially supported by the National Science Foundation and the Office of Naval Research.

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

During June 1978 the dominant surface weather feature was the subtropical high pressure system (Figure 2) which was displaced 500 miles northwest of the long-term position (Figure 1) with central pressures 8 to 10 millibars higher than normal. The Aleutian low pressure center, which normally lies over the Bering Sea near 57°N, 160°W (Figure 1) was positioned over Kamchatka (57°N, 160°E) in June. This represented a large departure from normal over the central part of the Pacific north of 40°N. As a result of the large westward shift in the Aleutian low pressure system, the surface wind circulation over nearly all of the eastern north Pacific was dominated by the subtropical high pressure system (see winds in Figures 1 and 2). During June the center of the high moved between 45°N, 130°W and 35°N, 155°W, but surface winds remained strong most of the month offshore between Cape Mendocino and Point Arguello.

The sea surface temperature (SST) pattern over the eastern central Pacific (Figure 3) reflected the persistence of the high pressure system where northerly surface winds prevailed and SST contours were more widely spaced than usual between 135°W and 150°W. West of 160°W and north of 35°N surface winds were more southerly than usual, and the SST north-south gradient was strong from 38°N to 42°N. The north Pacific ocean front was better defined along 40°N and west of 150°W than to the east because of the effect of persistent southerly winds that apparently brought warmer subtropical water northward, resulting in positive SST departures (Figure 5) south of 40°N and west of 165°W. During June 1977, SST's in this area were more than 1°C colder than in June 1978 because of the strong influence of the Aleutian low at that time. Along the north, east (to 135°W) and south periphery of the subtropical high, surface winds enhanced the southward transport and mixing of surface layers enough to maintain a large area with SST's more than 1°C below normal (Figure 5). SST's were 1 to 3°C colder in June 1978 than in June 1977 (Figure 7) between 30°N and 40°N west of 140°W because of the more intense high pressure system this year than last. East of 135°W, SST's remained above normal except for a narrow area along the California coast from 38°N to 33°N and offshore from the U.S. northwest coast. Coastal upwelling and strong northerly winds caused SST's to remain slightly below normal. Near shore along Washington and Oregon and offshore from 30°N to 40°N, SST's were more than 1°C above normal and also 1 to 2°C greater than in June 1977. Periodically, the high pressure ridge shifted over these areas causing lighter winds and more surface heating than normal. South of 25°N and from Baja California to 150°W, SST's were 1 to 2°C above normal and also warmer than June 1977. These positive departures developed primarily because three tropical storms moved northwestward from the tropics, transporting warmer water northward from the storm paths. The northwest displacement of the high pressure system, with the establishment of a weak upper air pressure trough along the U.S. west coast, led to the movement of tropical storms to the northwest and a weakening of northeast trade winds.

Western North Pacific

The surface wind circulation was dominated by the subtropical high pressure system over the western Pacific from 40°N to 20°N with surface pressures 3 to 7 millibars above normal from Japan to the central Pacific. North of 40°N surface pressures averaged 2 to 4 millibars below normal west of 160°E. Southerly winds north of 30°N along the northwest periphery of the high pressure system, combined with higher than normal pressure, apparently caused SST's to warm faster than normal over most of the area from 30°N to 40°N (Figure 6). During May 1978, SST's were below normal in this area.

The north Pacific ocean front appeared to be well defined in June between 40°N and 42°N (Figure 4), especially in those areas where negative SST departures north of 40°N were adjacent to positive SST departures (Figure 6). Negative SST departures greater than 1°C persisted where surface winds caused considerable ocean mixing on the periphery of the high system between 40°N and 50°N east of 160°E and also south of 30°N between 145°E and 165°E.

Eastern Tropical Pacific

From May to June sea surface temperatures (SST) normally increase in the northern hemisphere. The maximum increases of 1 to 2°C normally occur in the area from the southwest coast of Baja California to the Revilla Gigedo Islands. Elsewhere in the northern hemisphere SST's normally increase less than 1°C during June. Along the equator east of 120°W and in the Peru Current from Ecuador to southern Peru, SST's normally decrease 1 to 2°C. As midwinter approaches in the southern hemisphere SST's normally cool everywhere.

During June 1978 the SST pattern (Figure 8) over the eastern tropical Pacific showed a rapidly developed cold tongue of water extending from the coast of Peru northwestward to the Galápagos Islands and along the equator between 3°N and 5°S. Negative SST departures of more than 1°C covered more of the equatorial area than in May 1978 (Figure 9) and any previous June since 1975. Colder than normal equatorial water with large bands of above normal SST's from 5°N to 15°N and from 5°S to 15°S is characteristic of an emerging anti-El Niño period.

In the northern hemisphere, SST's were more than 1°C above normal over a large area from 12°N to 25°N between 112°W and 140°W. This was due, in part, to the northwestward displacement of the subtropical high pressure center (Figure 2) and below normal cloud cover and surface winds, particularly in the area with positive SST departures greater than 2°C (Figure 9). Tuna fishing was good most of the month along the southwest coast of Baja California south of 25°N where the north-south SST gradient was stronger than normal (Figure 8). Three tropical storms (two became hurricanes Carlotta and Daniel) developed after mid-June over warm water east of 100°W and moved westward through the fishing grounds south of the Revilla Gigedo Islands. Heavy rain squalls frequently developed along the Intertropical Convergence Zone, which usually coincides with warmer water stretching from Central America to the central Pacific. Areas of negative SST departures north of the equator and east of 110°W developed where storms rapidly intensified, causing heavy cloud cover and increased surface winds which led to a greater than normal heat loss from the ocean surface.

In the southern hemisphere, the subtropical high pressure center was near its normal position during May and most of June. As a consequence, the southeast trade winds along the coast of Peru and along the equator were near normal. This condition helped to maintain a more consistent upwelling of colder water along the equator and along the coast of Peru. The equatorial ocean front, where SST contours are closely spaced between Ecuador and the Galápagos Islands, was located near its normal position, and tuna fishing along the west coast of Ecuador from 2° to 4°S was significantly better than during June of the previous two years.

JUNE 1961 - 1978
FIG. 1 - OBSERVED MEAN VALUES
-0000-BAROMETRIC PRESSURE
(MILLIBARS).
RESULTANT WIND DIRECTION.
NO. RESULTANT WIND SPEED (KTS.)
NO. AVERAGE WIND SPEED (KTS.)
REGARDLESS OF DIRECTION.

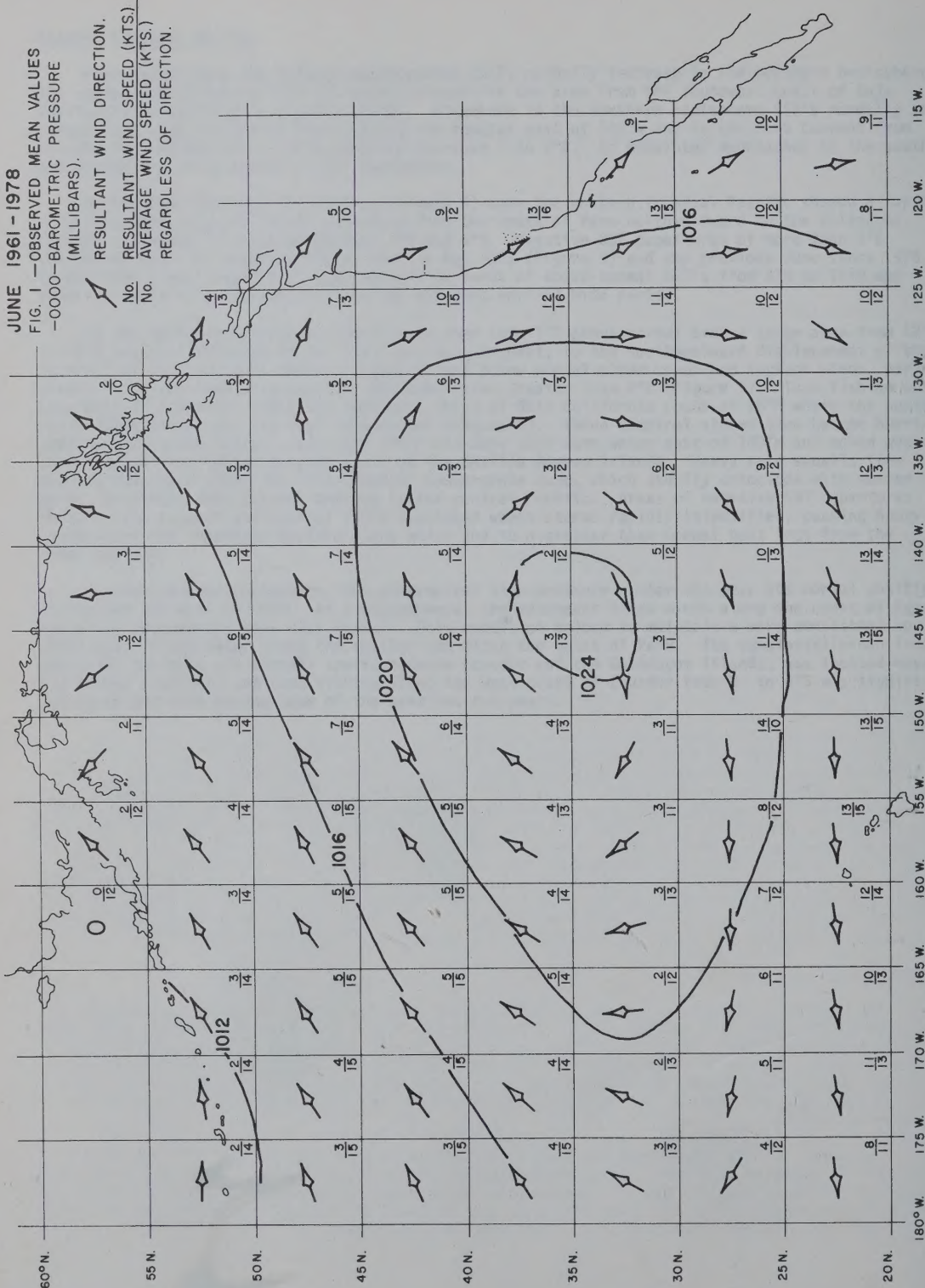
60°N. 55°N. 50°N. 45°N. 40°N. 35°N. 30°N. 25°N. 20°N.

180°W. 175°W. 170°W. 165°W. 160°W. 155°W. 150°W. 145°W. 140°W. 135°W. 130°W. 125°W. 120°W. 115°W.

RESULTANT WIND DIRECTION.

RESULTANT WIND SPEED (KTS.)

AVERAGE WIND SPEED (KTS.)

 $\ddot{\text{N}}|\ddot{\text{N}}$ 

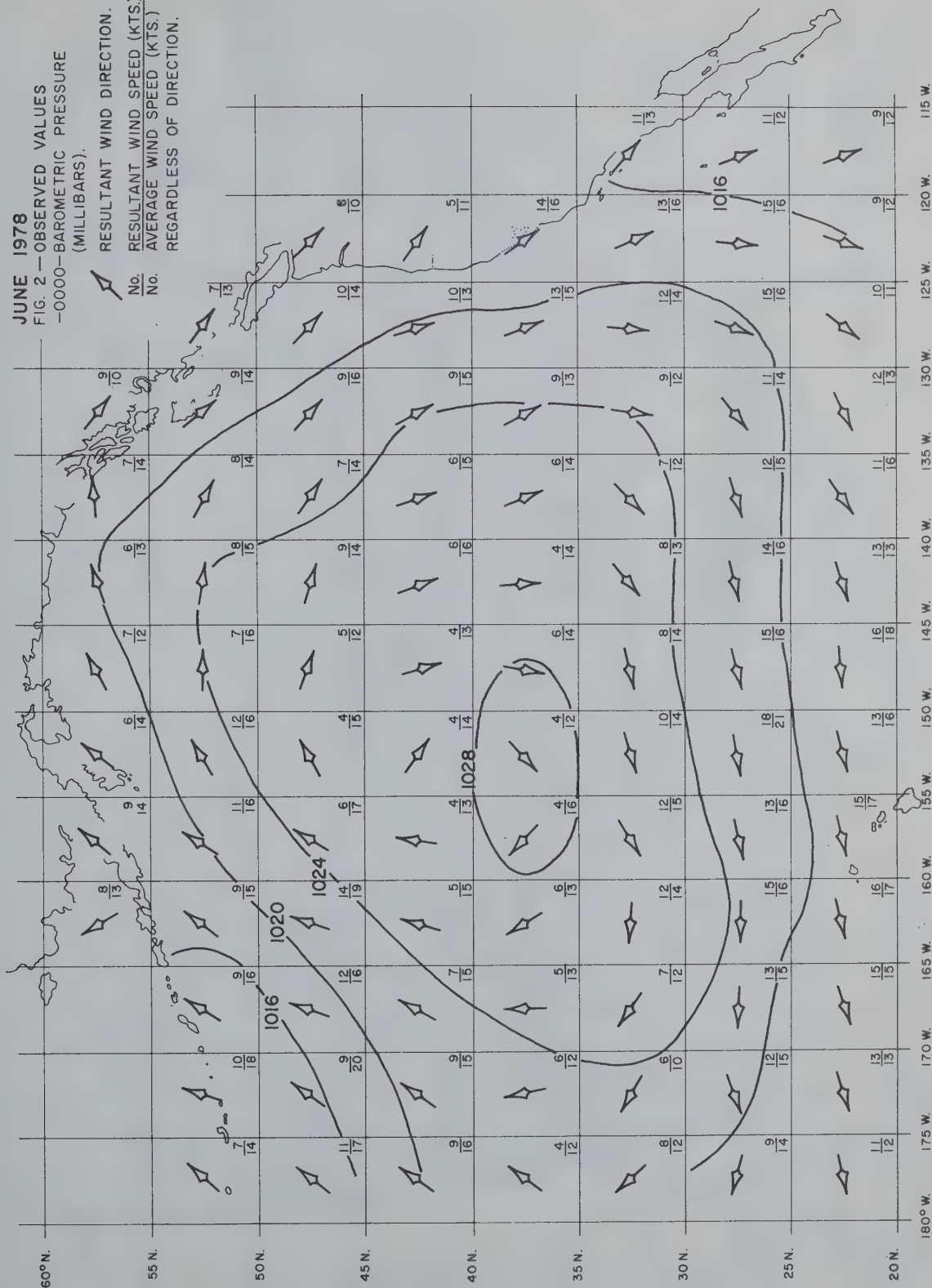
JUNE 1978

FIG. 2—OBSERVED VALUES

—0000—BAROMETRIC PRESSURE
(MILLIBARS).

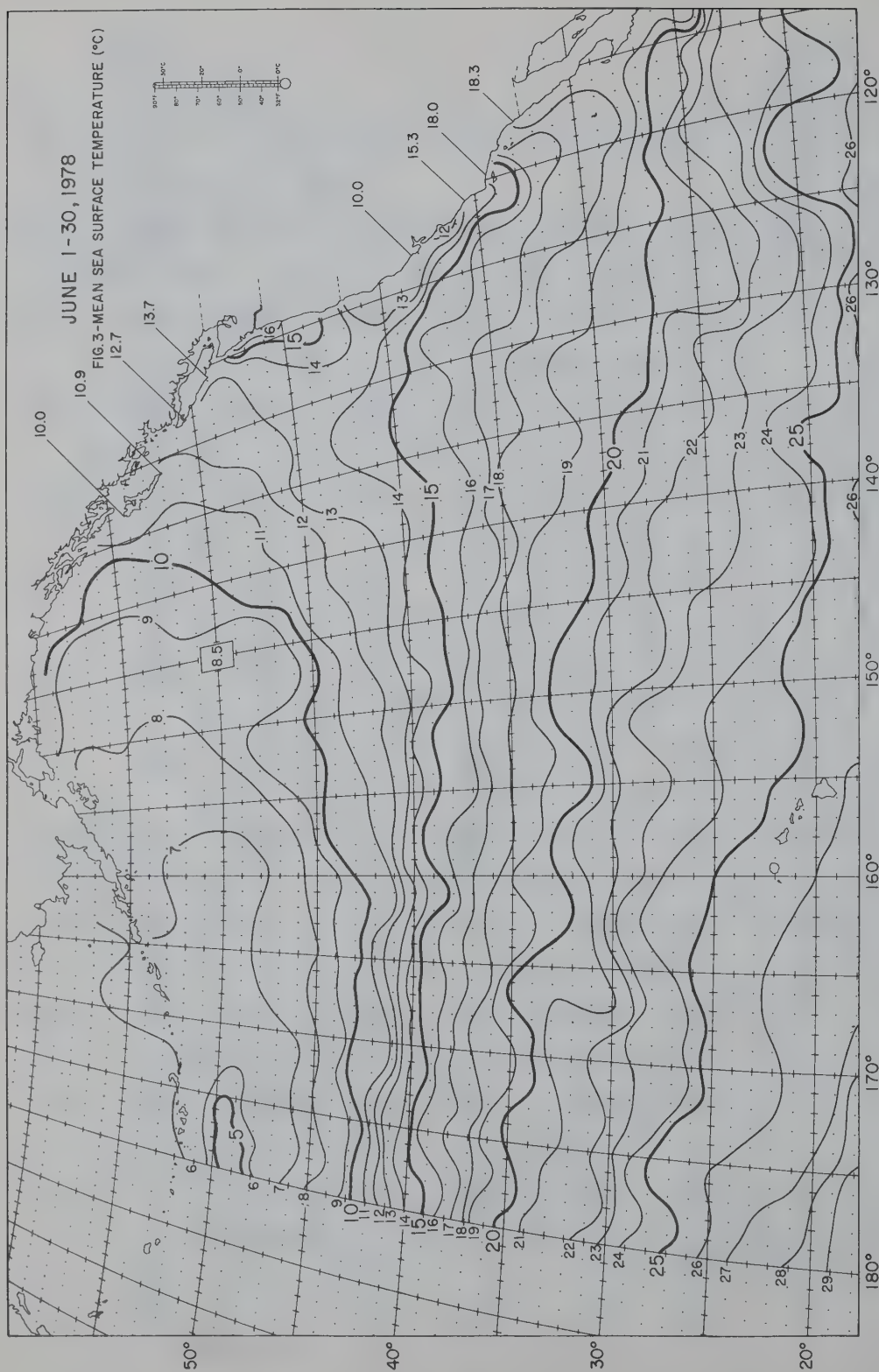
RESULTANT WIND DIRECTION.

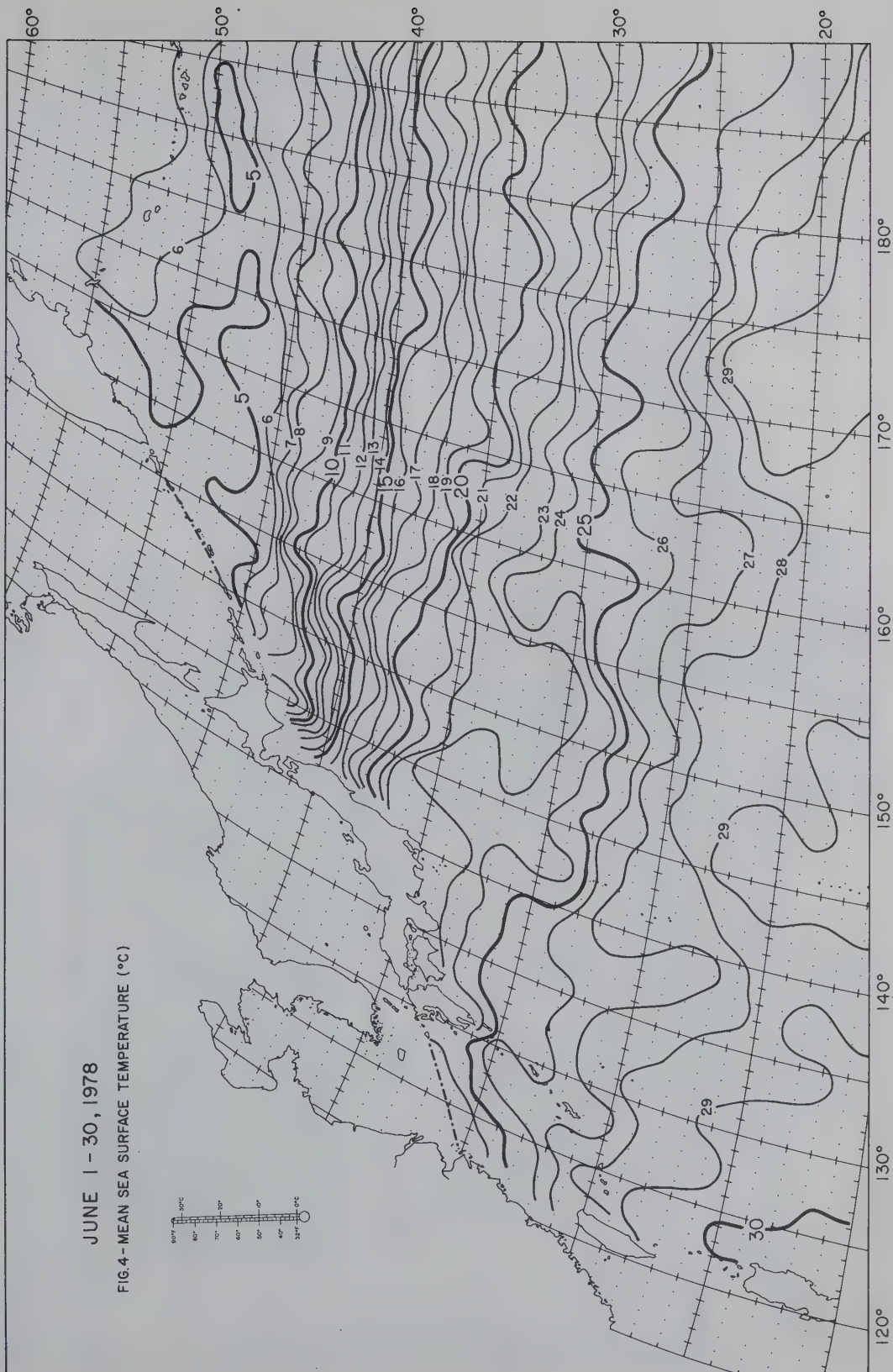
NO. RESULTANT WIND SPEED (KTS.)
NO. AVERAGE WIND SPEED (KTS.)
REGARDLESS OF DIRECTION.



JUNE 1-30, 1978

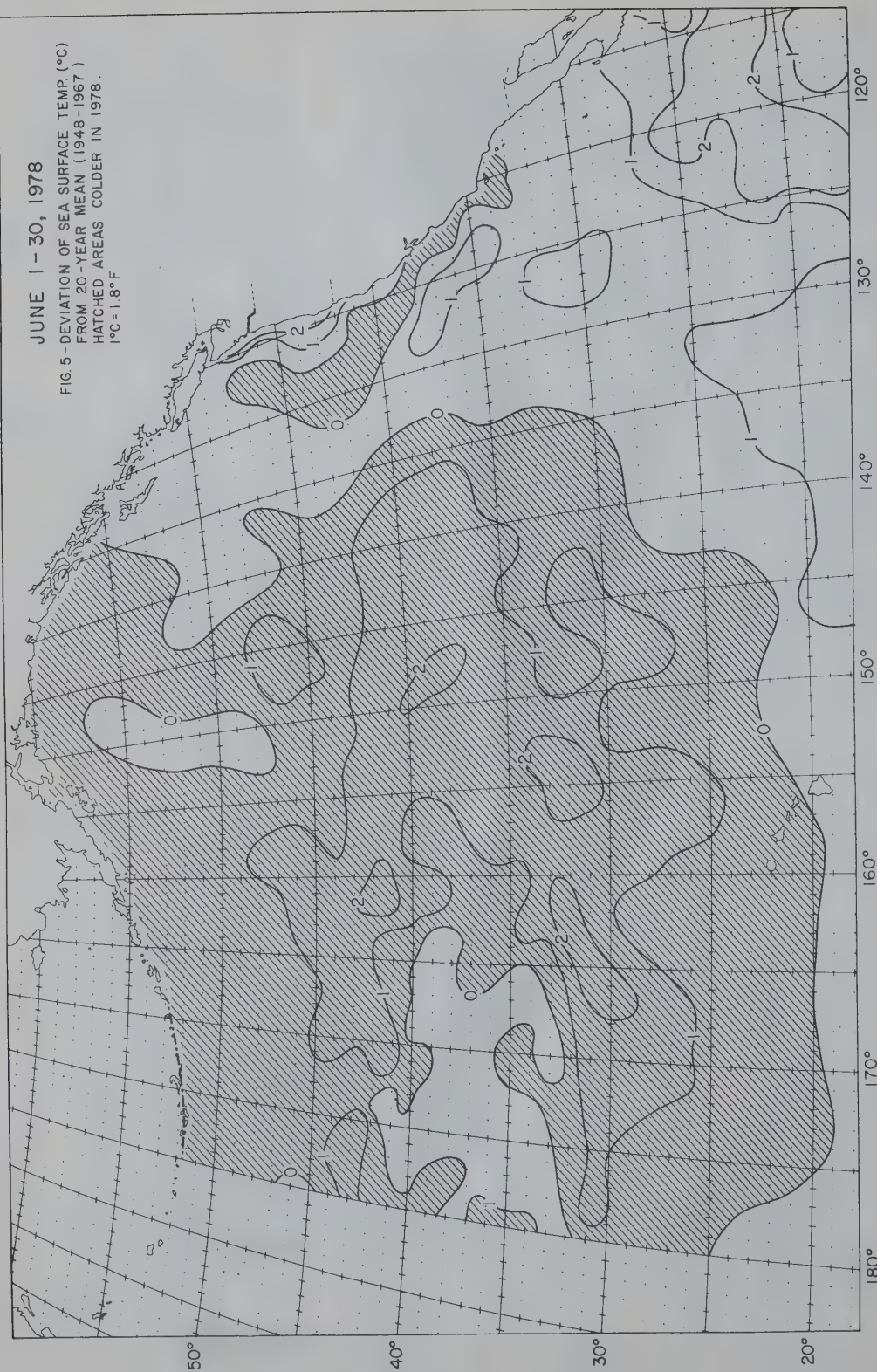
FIG. 3-MEAN SEA SURFACE TEMPERATURE (°C)





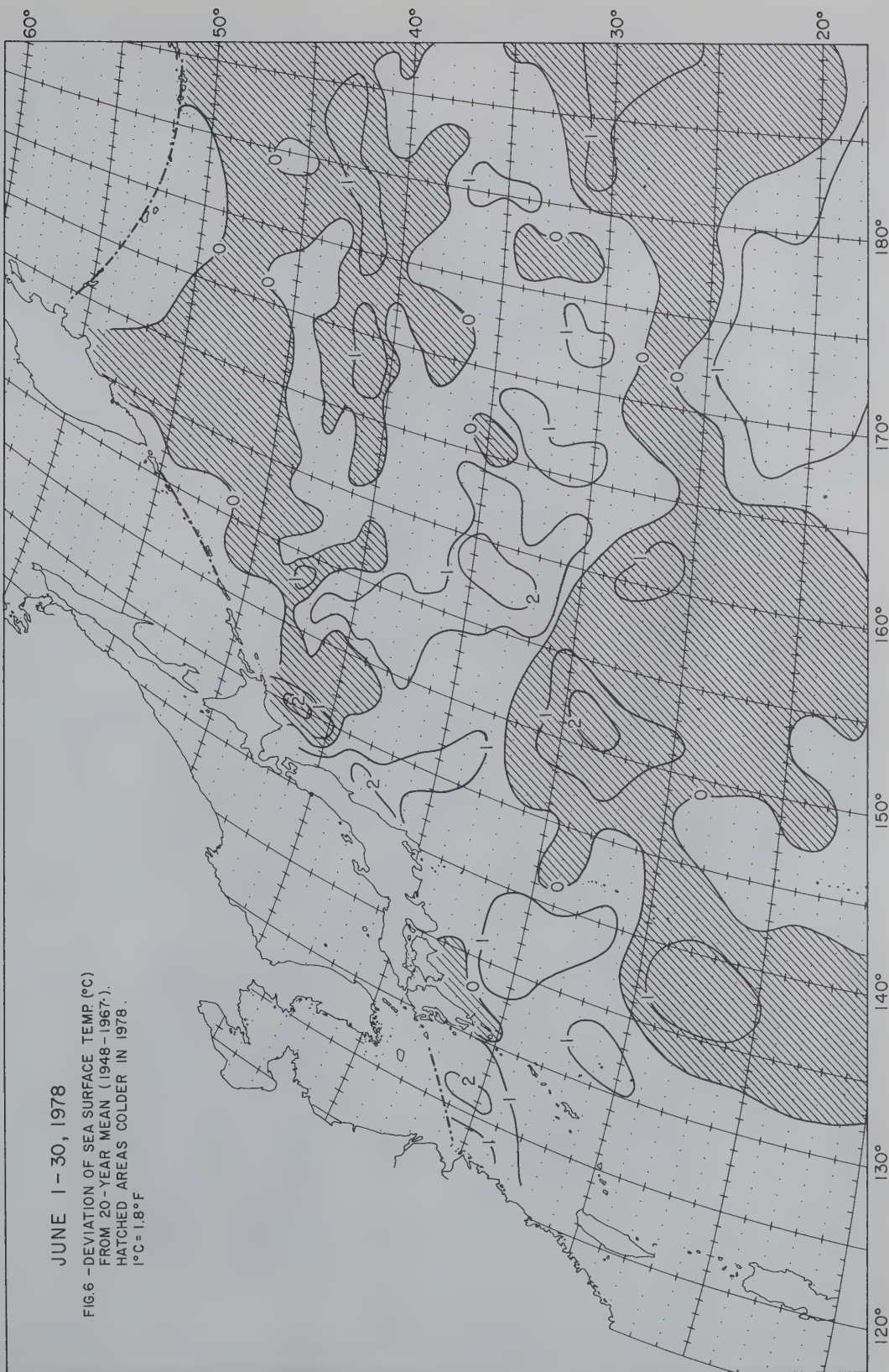
JUNE 1-30, 1978

FIG. 5 - DEVIATION OF SEA SURFACE TEMP. ($^{\circ}\text{C}$)
FROM 20-YEAR MEAN (1948-1967)
HATCHED AREAS COLDER IN 1978.
 $1^{\circ}\text{C} = 1.8^{\circ}\text{F}$



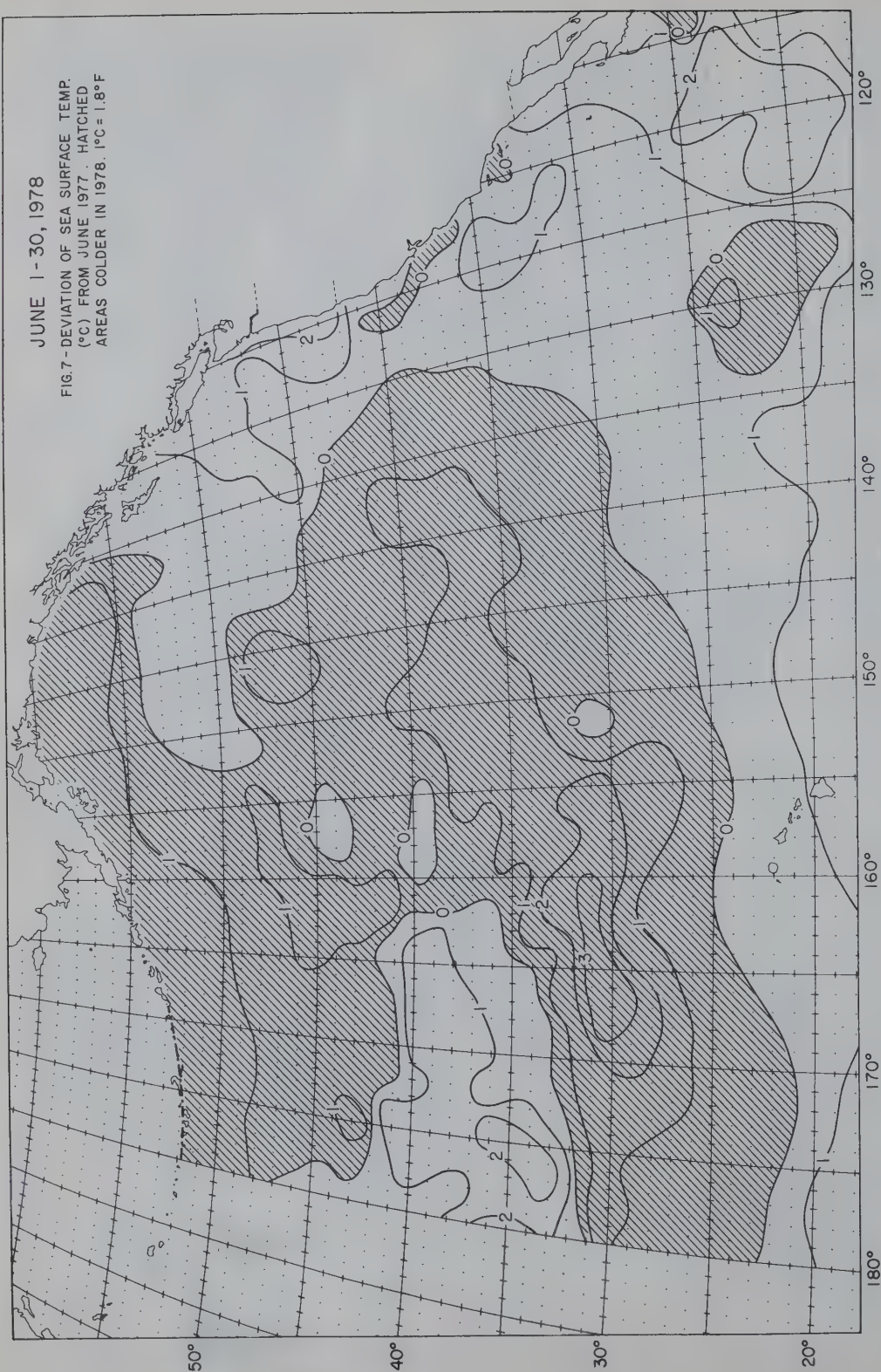
JUNE 1-30, 1978

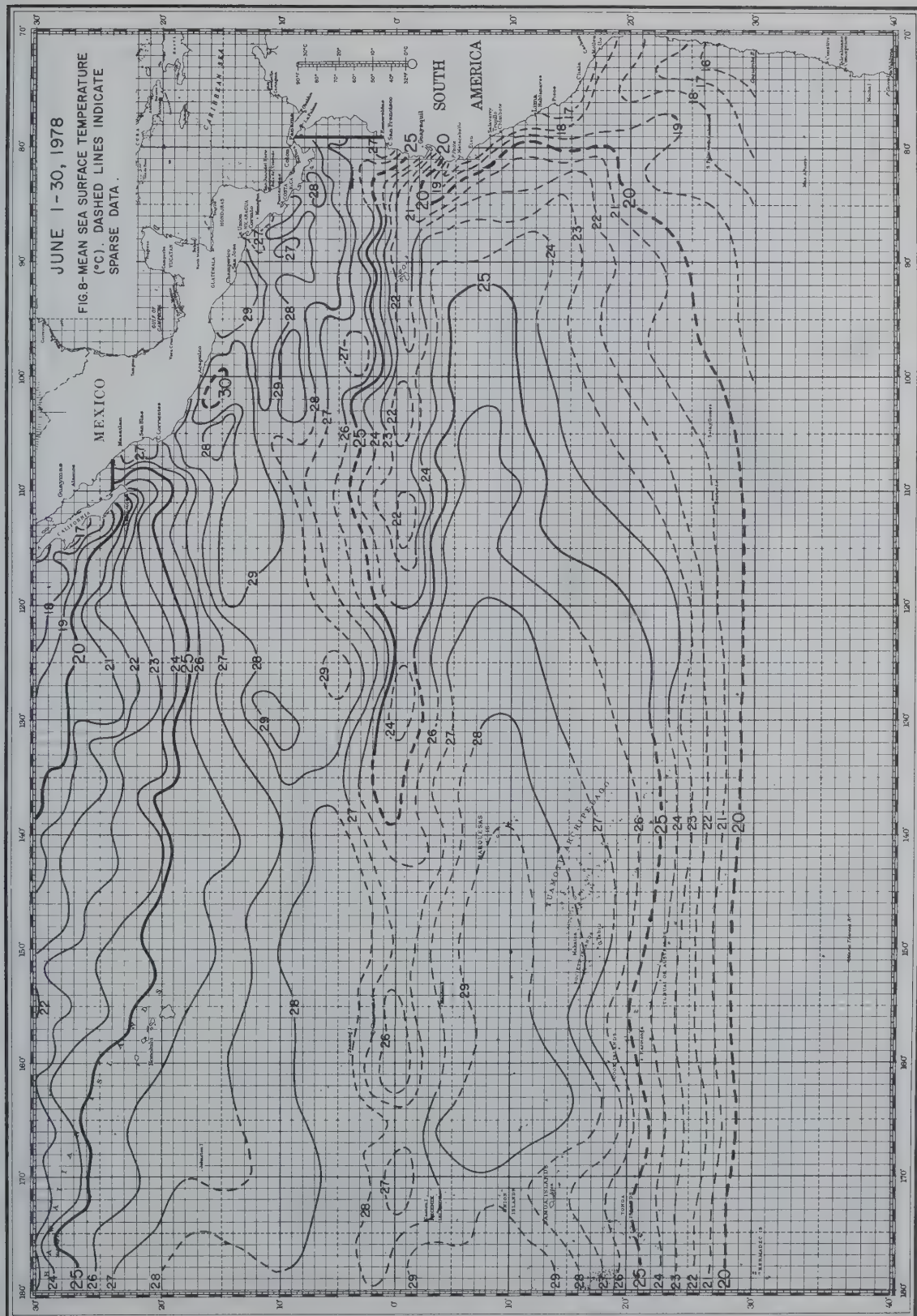
FIG. 6 - DEVIATION OF SEA SURFACE TEMP (°C)
FROM 20-YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1978.
1°C = 1.8°F



JUNE 1-30, 1978

FIG. 7 - DEVIATION OF SEA SURFACE TEMP.
(°C) FROM JUNE 1977. HATCHED
AREAS COLDER IN 1978. 1°C = 1.8°F





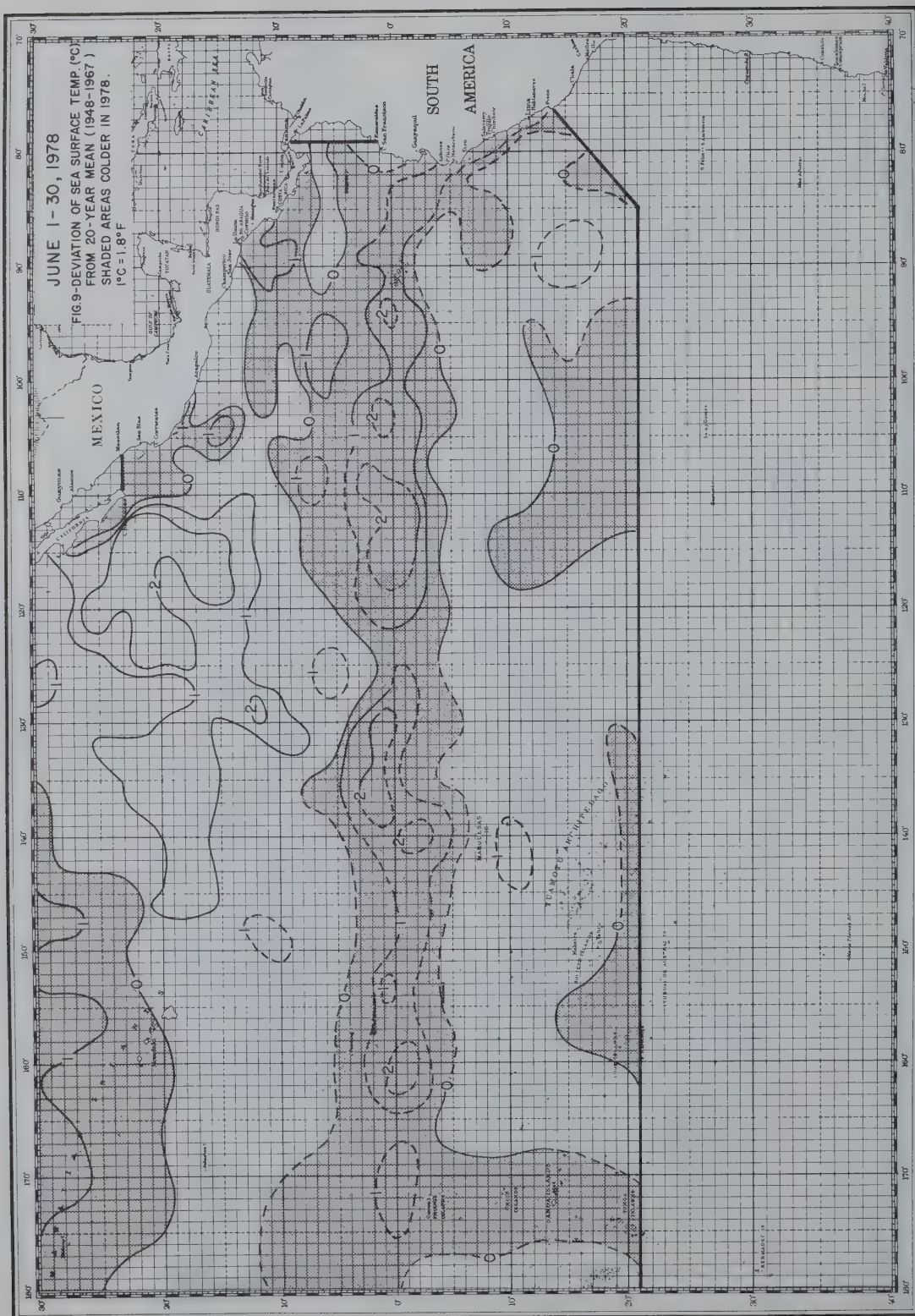
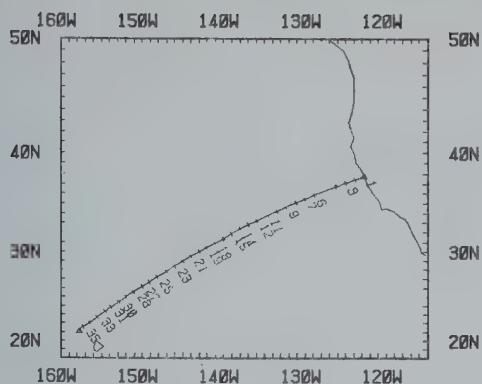


FIGURE 10



SHIP HAWAIIAN QUEEN

VOYAGE 227

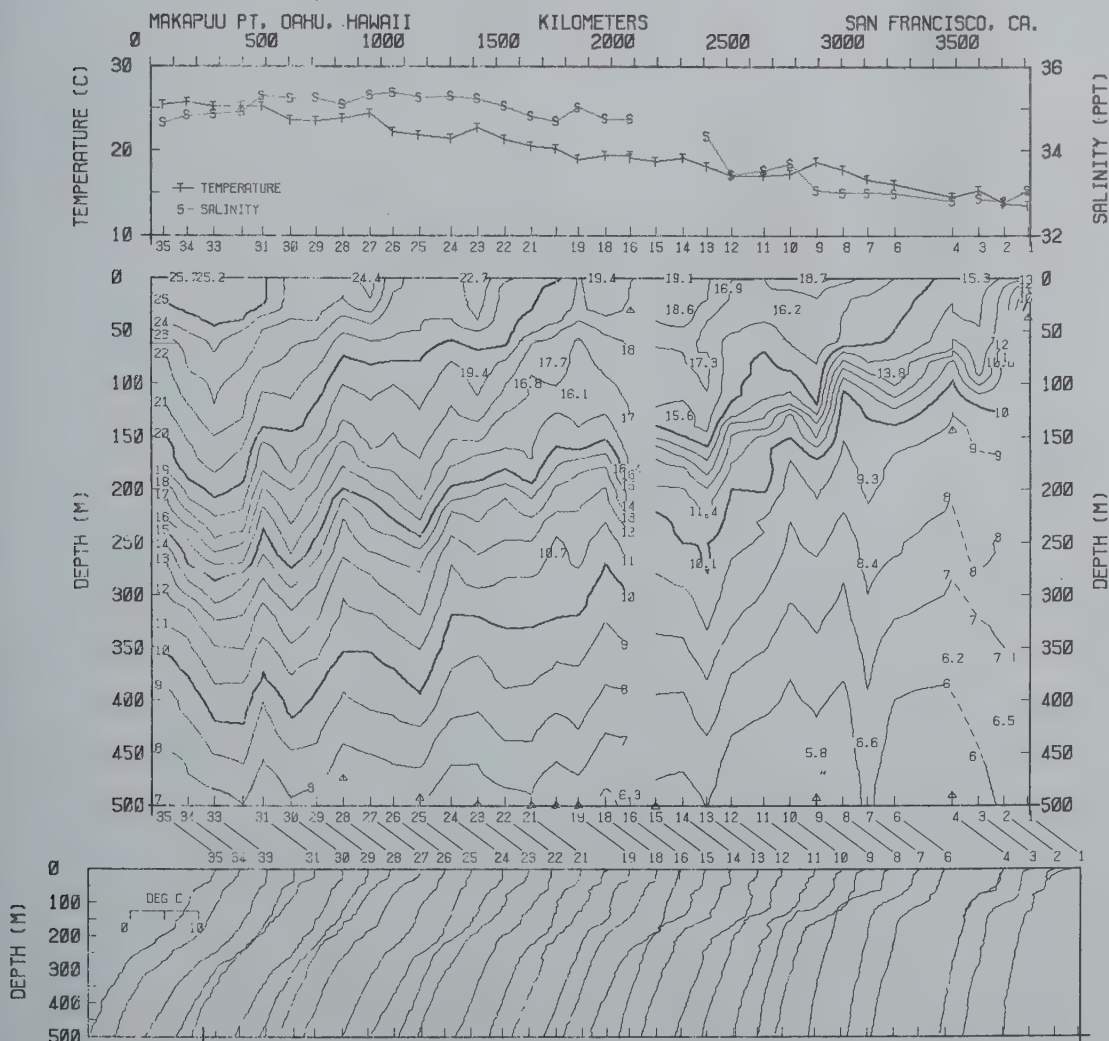
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- MAKAPUU PT, OAHU, HAWAII

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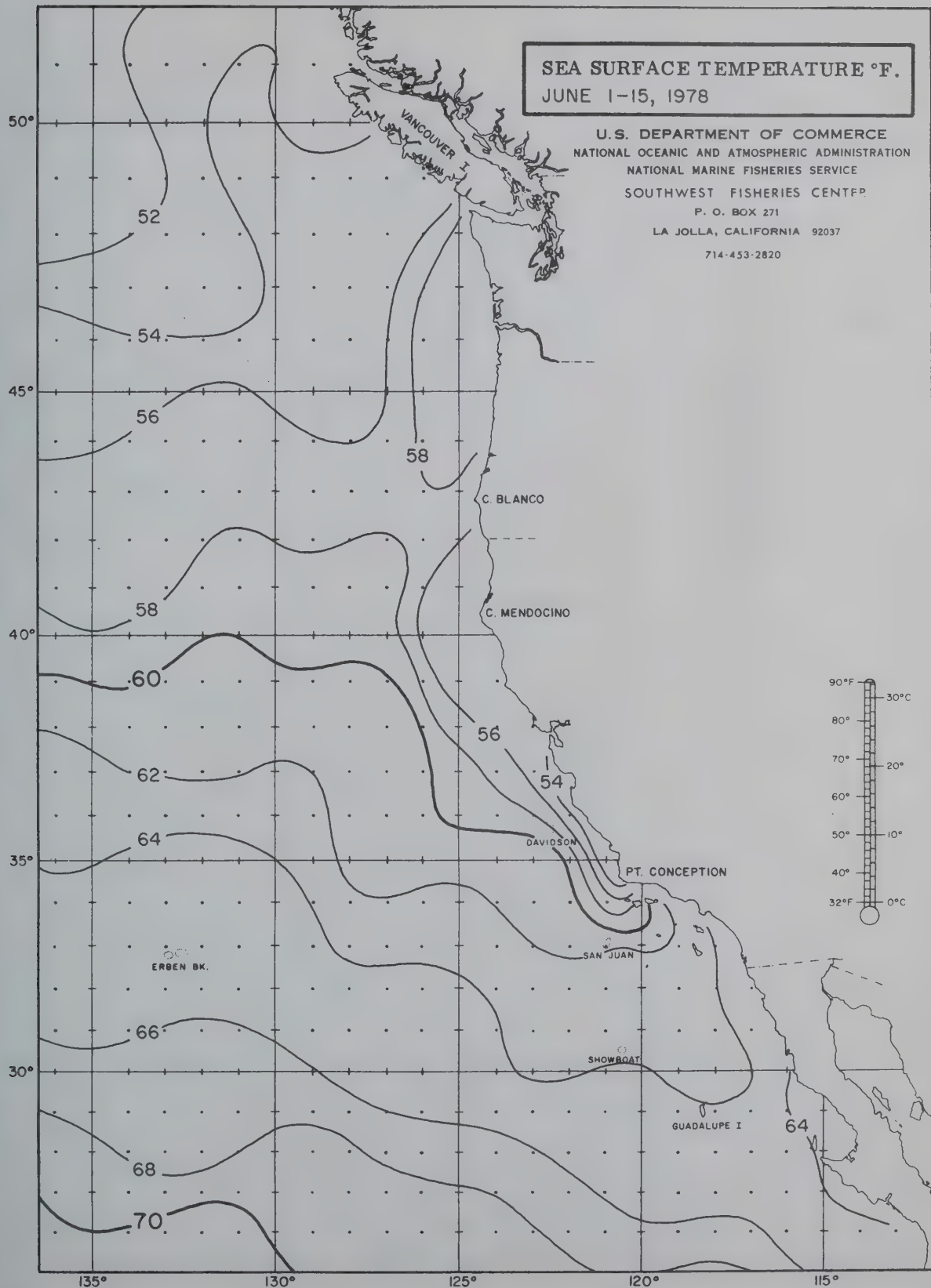




FISHING INFORMATION - supplement

SEA SURFACE TEMPERATURE °F.
JUNE 1-15, 1978

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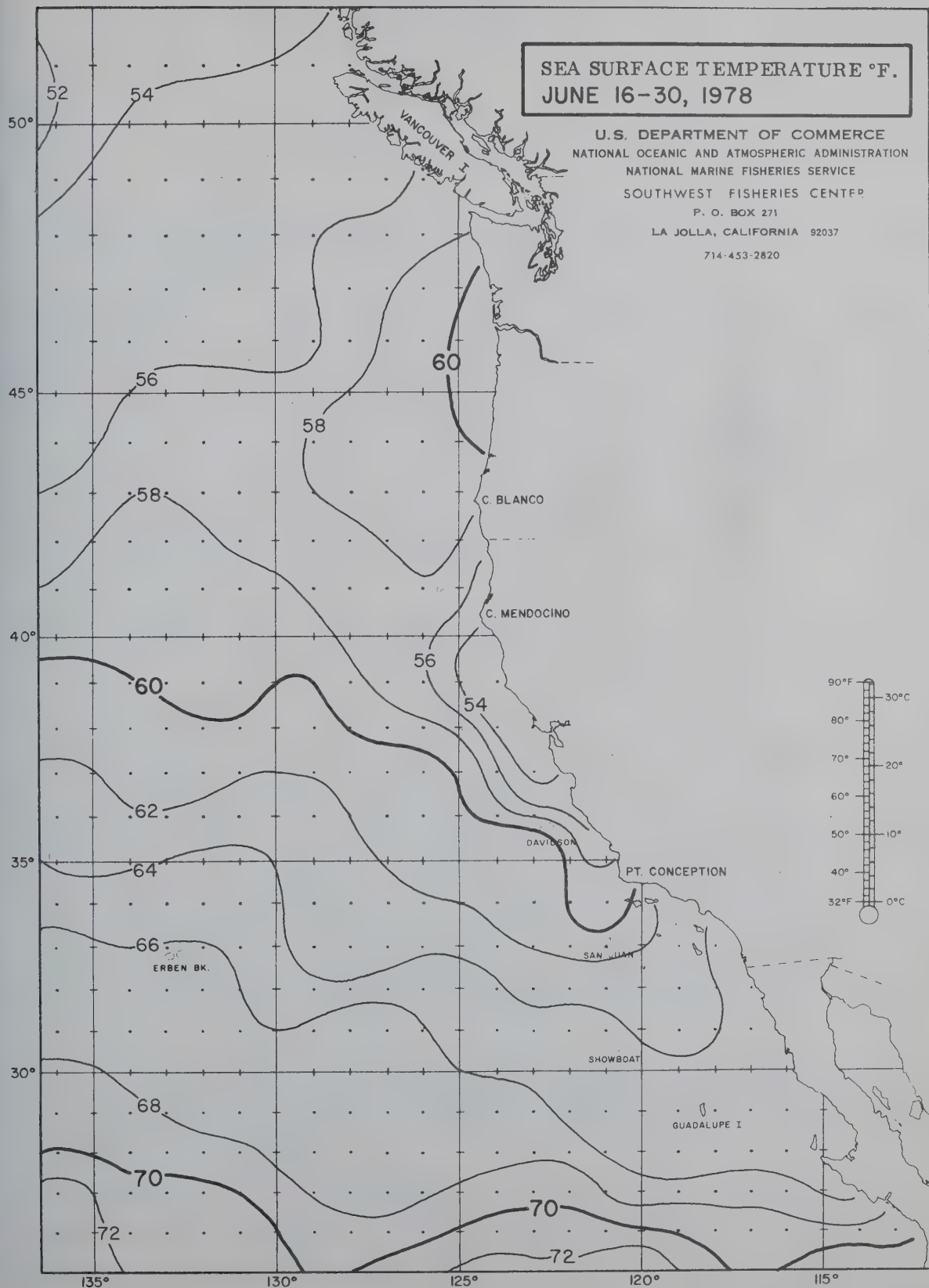


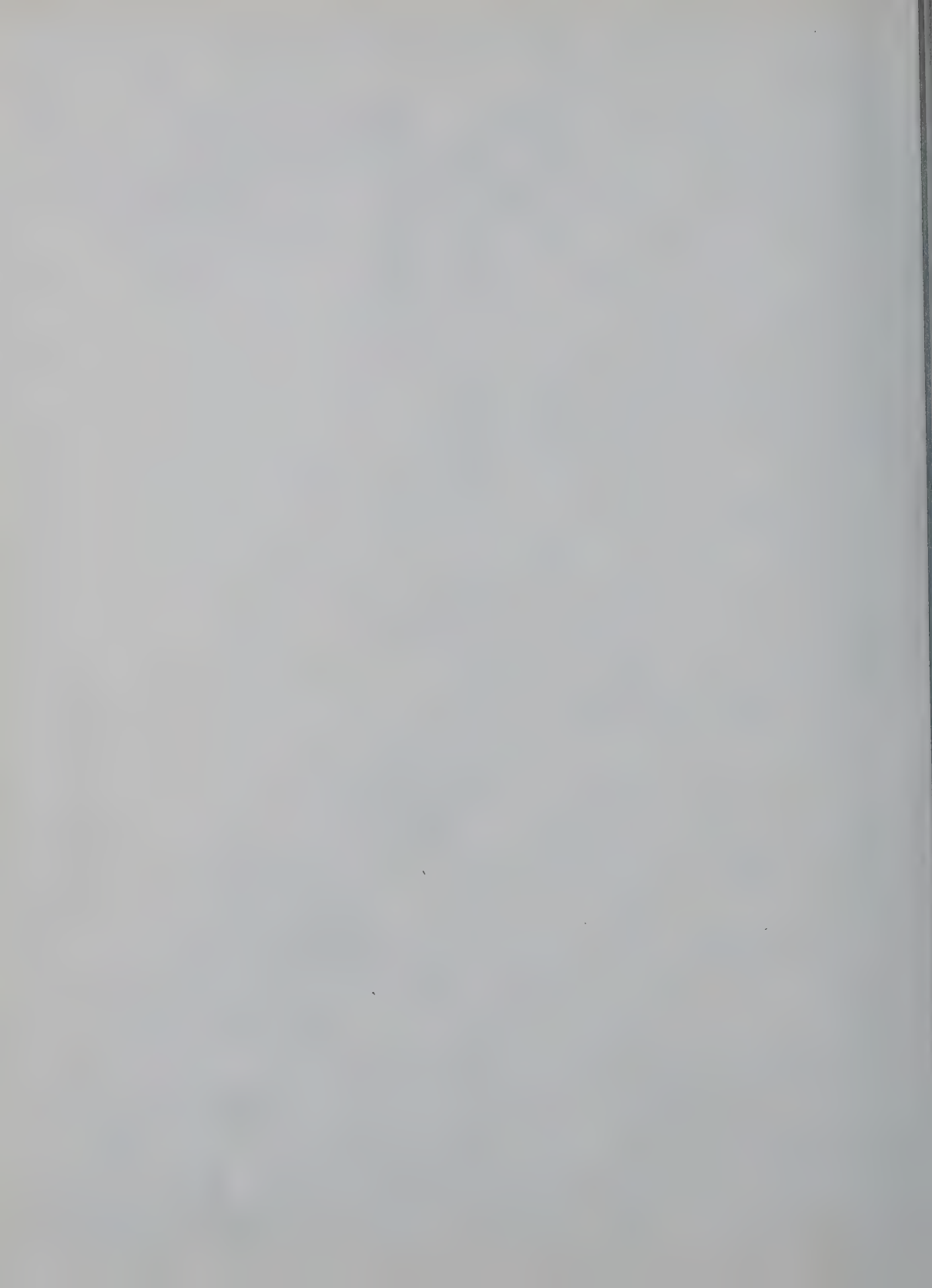
FISHING INFORMATION - supplement

SEA SURFACE TEMPERATURE °F.
JUNE 16-30, 1978

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Southwest Fisheries Center
La Jolla, California 92038

BULLETIN NO. 78-1

ALBACORE TUNA FORECAST FOR 1978

Number of conditions exist that could unfavorably affect the availability of albacore off the Pacific west. Lower fishing success in 1978. We anticipate that most of the U.S. albacore catch during the 1978 fishing will be taken off central and southern California and southward to Guadalupe Island. We estimate that approximately 75% of the catch will be taken in waters south of San Francisco and 25% in waters to the north.

Albacore are expected to be available earlier than normal this season in waters off southern California and southward to about Guadalupe Island. It appears that at least a portion of the "southern" group of albacore that enter the U.S. fishery in waters south of about San Francisco did not migrate into central Pacific waters, but spent more months in waters relatively close to central-southern Baja California. These fish could be available in the U.S. fishery off San Diego - northern Baja California by mid-June. The early availability of fish could contribute to a larger total catch from this area; however, there are two oceanographic conditions that, if they persist, could hamper overall fishing success. First, coastal upwelling has been unusually weak along much of the Pacific coast of California. The lack of upwelling can result (a) in less nutrient enrichment of near-surface ocean waters and consequently reduced food animals for albacore, and (b) in weak temperature fronts or "edges" where albacore often aggregate. These conditions can be very important in albacore fishing. If upwelling remains weak, albacore could be relatively scattered and fishing could be spotty. A second oceanographic condition that could limit fishing success in waters off southern California is unusually warm ocean temperatures. Sea surface temperatures in coastal waters off Baja California and southern California have been about 2° to 4°F (1.1 to 2.2°C) warmer than average during winter and spring months. If this warming is not retarded, sea surface temperatures could exceed the 68°F (20°C) upper limit of the optimal temperature preference of albacore by about September. This could cause the fish to move into deeper, cooler waters and make them more vulnerable to fishing gear or to move out of the area.

Temperature fronts or "edges" important in albacore fishing were also apparently poorly developed this year in the areas off central and northern California, except off Cape Mendocino, and off the Pacific Northwest as a result of weak coastal upwelling. If these conditions persist, fishing success could be hindered along much of the Pacific coast of the U.S. Fortunately, however, strong coastal upwelling can be established in response to a few days of northerly winds, and if the winds persist, well-developed temperature boundaries should be formed.

Catch of albacore from waters off the Pacific Northwest is expected to be limited this year. The major reason for this is an anticipated late arrival of the "northern" group of albacore that enter the U.S. fishery north of San Francisco. Results from albacore research studies in recent years indicate that the group of fish which enters the U.S. fishery off the Pacific Northwest is separate from the group that enters the fishery south of about San Francisco and that the two groups of fish follow different migratory patterns. The "northern" group makes trans-Pacific migrations between the eastern North Pacific and the western North Pacific where they are also fished on by Japanese albacore fisheries. The "southern" group does not migrate to and from the western Pacific, but probably migrates to the central Pacific, perhaps to the longitude of the Hawaiian Islands. The Japanese livebait fishery for albacore was late in starting and slow in developing this year, apparently in response to variations in oceanographic conditions in the western Pacific. This suggests that at least part of the "northern" group of albacore were late in migrating to the western Pacific this year for their migration to waters off the Pacific Northwest. It is not possible to estimate how much of the "northern" group will arrive in the eastern Pacific to be available to the U.S. fishery; however, there is a good possibility that a large portion of the fish will not have time to make the migration before temperatures in the Pacific Northwest cool below the optimal temperature preference for albacore. Three U.S. jigboats, based in San Diego (one vessel) and Honolulu (two vessels) in early May to conduct albacore exploratory fishing studies across the North Pacific and into the western Pacific, made their first substantial catches of albacore (approximately 200 or more fish per day) during the last couple days of May from a body of fish near 35°N. If this body of fish, which presumably is migrating to the eastern Pacific, continues to migrate and enters the Pacific Northwest, it should arrive there near mid-August.

NMFS La Jolla Laboratory will issue albacore advisory information throughout the 1978 season. The advisory information will include sea surface temperature charts, narrative albacore fish bulletins, and daily broadcasts of albacore fishing information over marine and commercial radio bands. The broadcasts will be made twice daily on weekdays and once on Saturday mornings from July 10 through October 31, or until the albacore season ends. Nearly 100% reception of the albacore fishery advisory broadcasts will be available again this year. The schedule of frequencies for the broadcasts are as follows:

WWD (La Jolla, CA) on SSB carrier frequencies 4431.8, 8644.1, 8753.0, and 1314.1 kHz at 0615 PDT weekdays and 0815 PDT on Saturdays.

NMC (Point Reyes Coast Guard) on SSB carrier frequency 8760.8 at 0645 and 1945 PDT.

KRED (Eureka, CA) - Schedule to be given later.

KBBR (North Bend, OR) on commercial AM 1340 kHz at 0605 and 1805 PDT.

KNPT (Newport, OR) on commercial AM 1310 kHz at 0615 and 1830 PDT.

KAST (Astoria, OR) on commercial AM 1370 kHz at 0610 and 1805 PDT.

To determine the upper sideband assigned frequencies for tunable receivers, add 1.4 kHz to WWD and NMC carrier frequencies. NMFS will also transmit weekly charts of sea surface temperature via radio facsimile over radio station WWD on Fridays, at 10:00 PDT on 8644.1 kHz beginning July 1.

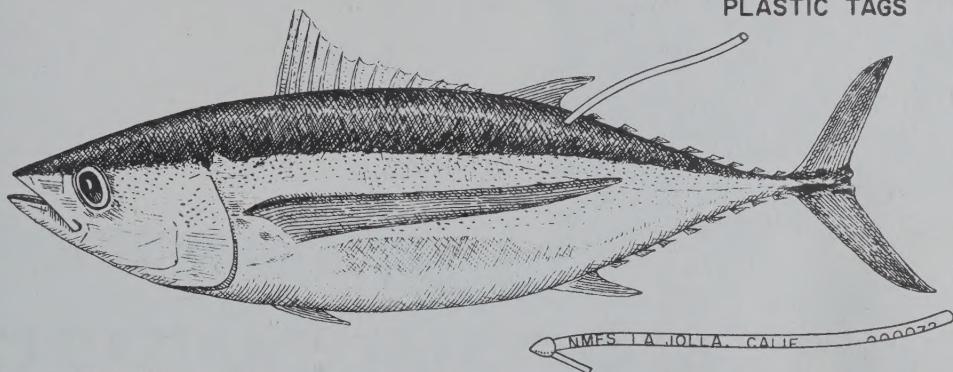
June 13, 1978

Staff, Albacore Fisheries
R. Michael Laurs, Leader

\$ REWARD \$

FOR ALBACORE TUNA TAGS

PLASTIC TAGS



YELLOW TAGS

THE NATIONAL MARINE FISHERIES SERVICE WILL PAY \$ 2.00 FOR EACH YELLOW TAG RECOVERED. (NO NEED TO RETURN FISH)

RECORD:

- ▶ WHERE
- ▶ WHEN
- ▶ HOW

}

FISH WAS CAUGHT

- ▶ LENGTH OF FISH (TIP OF LOWER JAW TO FORK OF TAIL)

FORWARD TO NMFS ADDRESS ON TAG

RED TAGS

THE NATIONAL MARINE FISHERIES SERVICE WILL PAY \$ 50.00 FOR EACH RED TAG & FISH RETURNED. (FISH WITH TAG INTACT MUST BE RETURNED)

RECORD:

- ▶ WHERE
- ▶ WHEN
- ▶ HOW

}

FISH WAS CAUGHT

- ▶ LENGTH OF FISH (TIP OF LOWER JAW TO FORK OF TAIL)

NOTIFY NMFS P.O. BOX 271, LA JOLLA, CA. TEL. (714) 453-2820

THE AMERICAN FISHERMEN'S RESEARCH FOUNDATION WILL AWARD CASH PRIZES FOR YELLOW & RED TAG NUMBERS DRAWN IN AN ANNUAL LOTTERY.

REWARD \$

FOR ALBACORE TUNA TAGS



YELLOW TAGS

IF NATIONAL MARINE FISHERIES SERVICE WILL PAY \$200 FOR EACH
YELLOW TAG RECOVERED (NO NEED TO RETURN FISH)

RECORD
FISH WAS CAUGHT
WHERE
WHEN
HOW
PENALTY FOR PRIVATE USE, \$300
OFFICIAL BUSINESS

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DEPARTMENT OF COMMERCE

U. S. DEPARTMENT OF COMMERCE
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COM-210



RECORD
FISH WAS CAUGHT
WHERE
WHEN
HOW

LENGTH OF FISH (TIP OF LOWER JAW
TO FORK OF TAIL)

NOTE: IF YOU BOX 271, LA JOLLA, CA TEL. 733-2820

THE AMERICAN FISHERIES RESEARCH FOUNDATION WILL REWARD
CASH PRIZES FOR YELLOW & RED TAG NUMBERS DRAWN IN AN
ANNUAL LOTTERY